GeeXboX Enna: Embedded Media Center

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GeeXboX Enna: Embedded Media Center
The GeeXboX sub-project(s)

- The GeeXboX team focus on multimedia oriented projects:
  - **GeeXboX** itself, an embedded multimedia Linux distribution, for both standalone Set Top Boxes and HTPC.
  - **Enna**, EFL-based low resources Media Center interface.
  - **uShare**, a free UPnP A/V and DLNA Media Server.
  - **libdlna**, reference DLNA protocol OSS implementation.
  - **libplayer**, a multimedia A/V abstraction layer framework.
  - **libvalhalla**, a tiny media information scanning library.
  - *A few (yet) minor other projects ...*

GeeXboX

Embedded Multimedia Linux Distribution

http://www.geexbox.org/

GeeXboX Enna: Embedded Media Center
Embedded Multimedia Distribution

- Major Live-CD multimedia distribution since 2003.
- Designed both for full blown HTPC and embedded devices.

- Turns your computer into a full-featured Set-Top-Box:
  - Play any kind of multimedia content (audio, video, photos …)
  - From various locations: Disk, NFS, Samba, WebRadios, UPnP/DLNA …
  - Supports CDDA, DVD, Analog TV and DVB playback.
  - Fully controlable through LIRC-compatible remote.

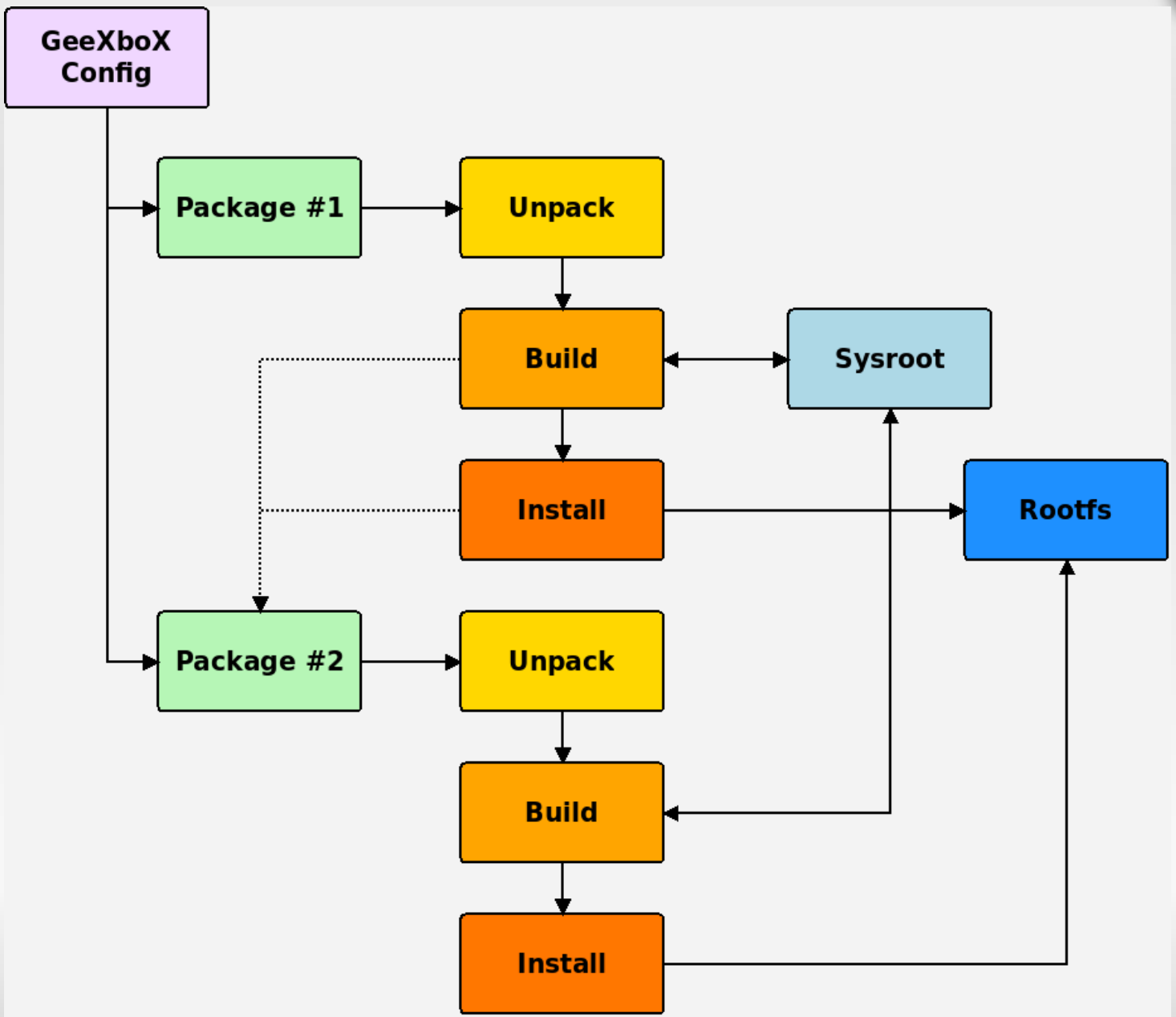
- Ready-to-be-used by end-user: minimalistic configuration.
- Available as a LiveCD, OS for USB key, multi-boot on HDD ...

GeeXboX Enna: Embedded Media Center
What's under the hood

- Bare-metal Linux distribution, completely built from scratch:
  - Not related/forked from any other distribution.
  - Based on its own shell-based cross-compilation framework, (similar to Buildroot, OpenEmbedded, OpenWRT …)
  - Supported architectures:
    ARM, PowerPC (32 and 64 bits) and x86 (32 and 64 bits)
  - Supports GLIBC, eGLIBC and uClibc.
  - Up to 350 packages with build dependencies management.

- System footprint: 8-64 MB, depending on build options.
- Low RAM usage: 128 MB typical, 256 MB for LiveCD.
- Distribution goal: ready to be used, booted as fast as possible.

GeeXboX Enna: Embedded Media Center Cross-Compilation Framework



GeeXboX Enna: Embedded Media Center
Customizable Build Flavours

- Versatile toolchain and build flags:
  - Can generate generic code to support once and every PC.
  - Or be optimized to your exact device's SoC instruction set.
- 100% free or using proprietary:
  - Packages: SGX OpenGL libraries, MAME ...
  - Drivers: nVidia X.Org driver, MADwifi ...
  - Firmwares: for WiFi and DVB chipsets …
- Optional support for WiFi, TV/DVB and Networking services.

GeeXboX Enna: Embedded Media Center Runtime Features

- Select between video stacks:
  - Console/framebuffer only mode with VIDIX enhancements.
  - Bleeding-edge X.Org with Kernel Mode Settings (KMS) support.
- System init through UpStart:
  - Modularized and highly configurable.
  - Event-based with parallelized services.
- Video Decoding capabilities:
  - Soft: optimized for multi-core H.264 and VC-1 decoding.
  - Hard: support VDPAU, soon to add VA-API, CrystalHD, and OpenMAX.

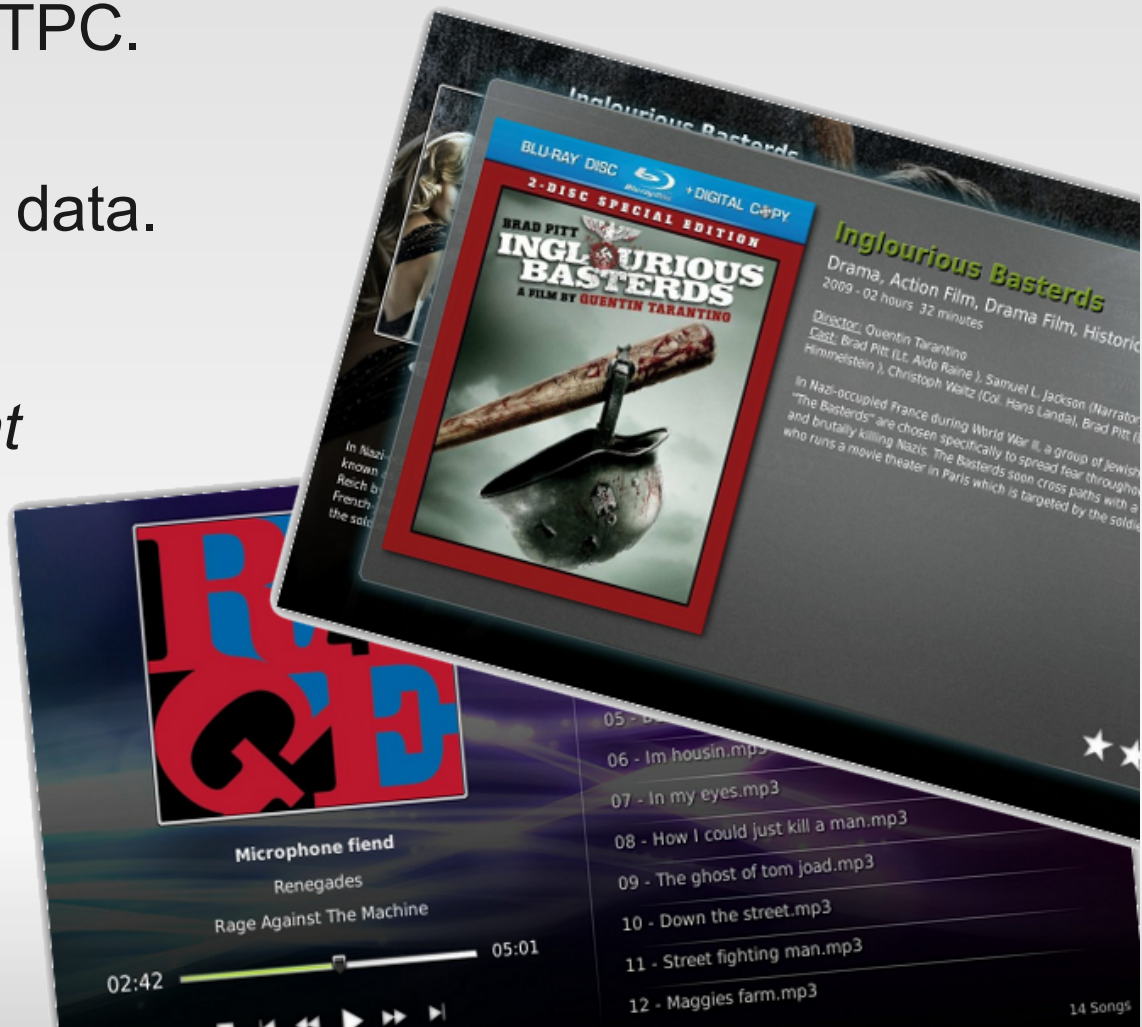
Enna

EFL Media Center Interface

http://enna.geexbox.org/

GeeXboX Enna: Embedded Media Center Overview

- Enna is an embedded Media Center application.
- Meant to run on low-resources embedded devices (phones, STB) as well as HTPC.
- Small footprint:
  250 kB binary only + theme data.
- Written in pure C.
- GUI relies on *Enlightenment Foundation Libraries* (EFL).
- Multimedia playback capabilities and metadata information retrieval rely on GeeXboX *libplayer* and *libvalhalla* projects.



GeeXboX Enna: Embedded Media Center
Main Features

- Main modules are:
  - Music Player
  - Movies & TV Shows Player
  - Photos Viewer
  - Weather forecast
  - Online eBook Reader from various online content providers.
  - Digital TV through VDR (VideoDisk Recorder) frontend
  - Games Aggregator (e.g MAME, Emulators ...)

GeeXboX Enna: Embedded Media Center
User Centric

- Designed with embedded considerations in mind (low footprint).
- Meant to be user convenient and plug-and-play.
- Controllable through keyboard, mouse, touchscreen and remote.
- Modularized and skinnable.
- Available for:
  - GeeXboX v2.x.
  - GNU/Linux distributions (Ubuntu 10.04 LTS ...)
  - Mac OSX (in progress)
  - Windows (in progress)

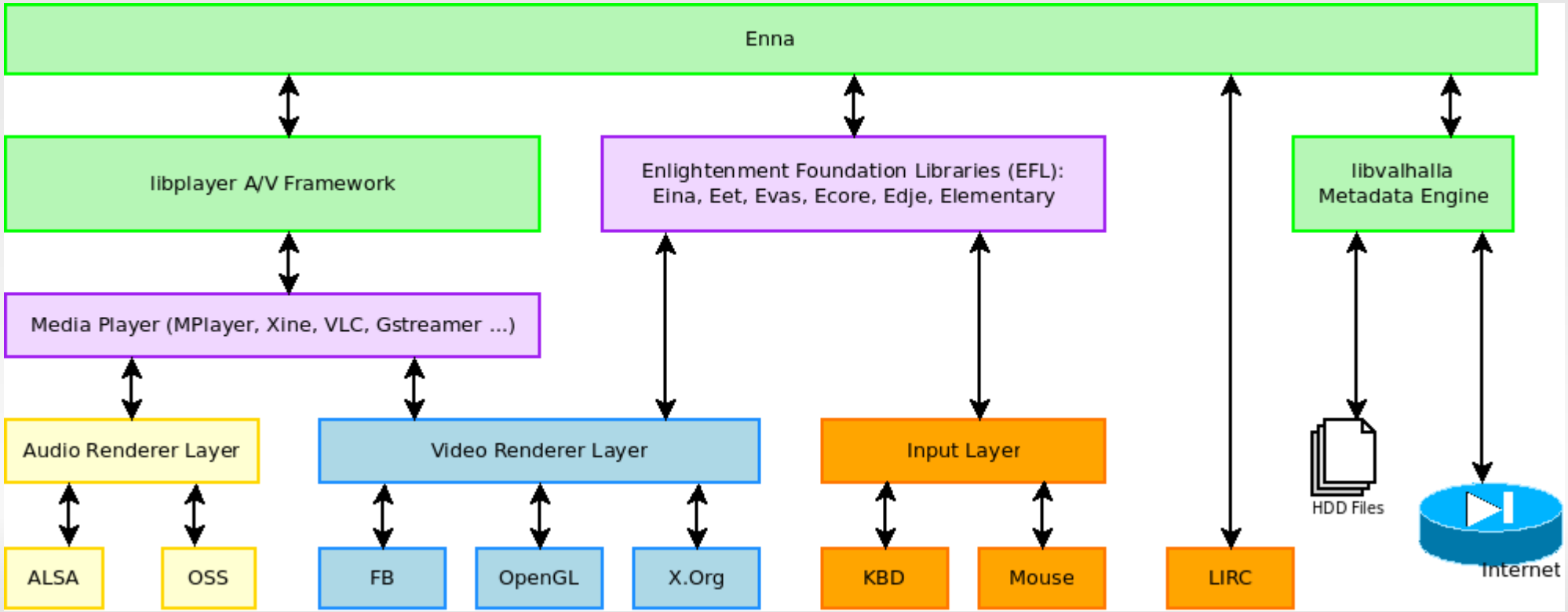
GeeXboX Enna: Embedded Media Center
Supported Protocols

- Dynamic media detection through:
  - mtab
  - HAL
  - UDEV

- Media Browsing protocols:
  - *Local disks*
  - *CDDA*
  - *DVD*
  - *Media Database*
  - *SHOUTcast*
  - *Podcasts*
  - *UPnP A/V and DLNA*
  - *Bluray, some day ...*

GeeXboX: An Introduction to Enna Media Center Software Architecture

- Built on Enlightenment Foundation Libraries (EFL) and GeeXboX multimedia libraries (*libplayer* and *libvalhalla*).
- Enna is presentation-level only: provides many abstraction layers.



EFL

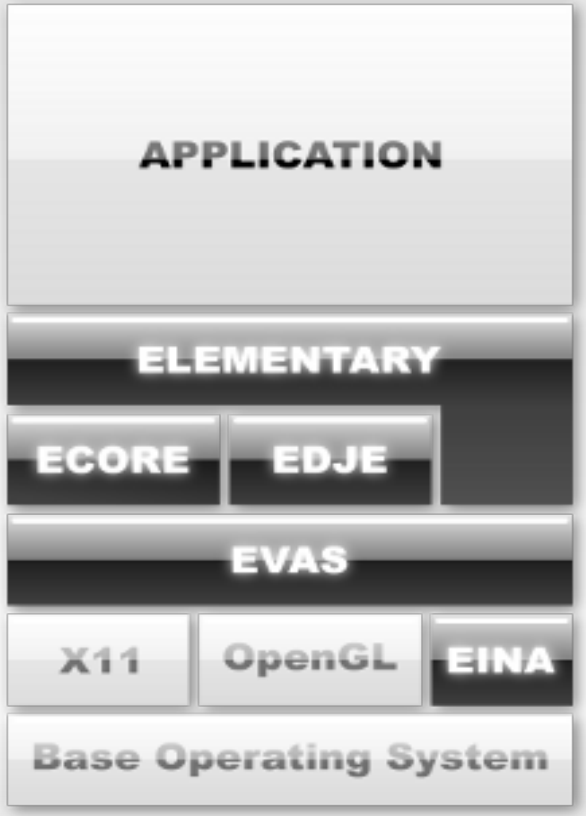
Enlightenment Foundation Libraries

http://www.enlightenment.org/

GeeXboX Enna: Embedded Media Center
Enlightenment Foundation Libraries

- EFL are ”*a whole suite of libraries to help you create beautiful user interfaces with much less work than doing it the old fashioned way and fighting with traditional toolkits*”.

  - **Eina** provides optimized data types and useful tools.
  - **Evas** is the canvas display layer.
  - **Ecore** is a tiny event loop library.
  - **Edje** is a graphical design and layout library which allows extremely flexible dynamic layouts and animations.
  - **Elementary** is a widget set.



libplayer

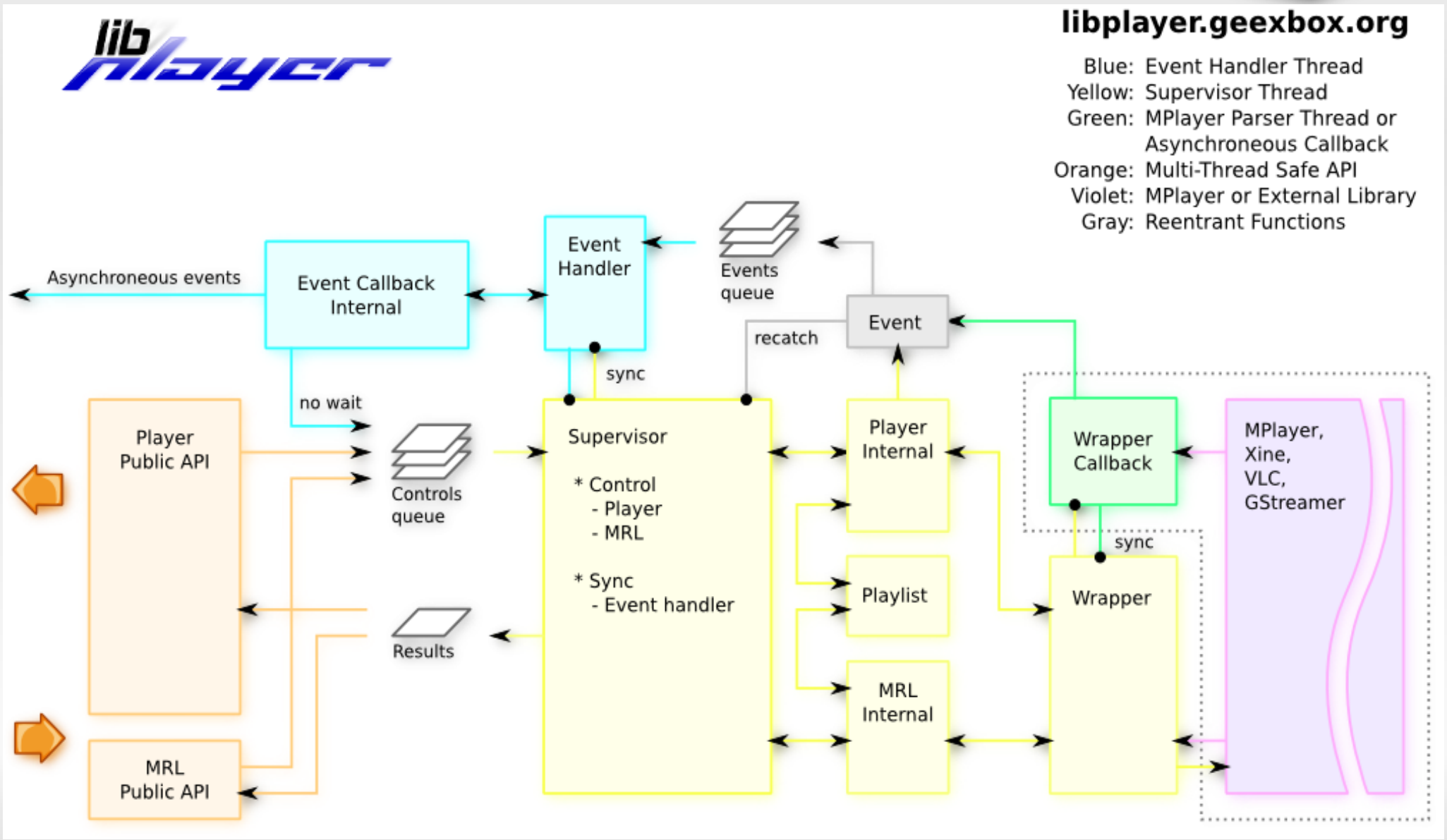
Multimedia A/V Abstraction Layer Framework

http://libplayer.geexbox.org/

GeeXboX Enna: Embedded Media Center
libplayer

- libplayer is a multimedia A/V abstraction layer framework.
- Provides a generic API to control various multimedia players:
  - MPlayer, through FIFO-based slave-mode.
  - Xine
  - VLC (requires to-be-released v1.1 API)
  - GStreamer (preliminary, yet experimental)
- Fully thread-safe.
- Player controls and notification are offloaded to frontend.
- Supports most of currently available A/V renderers:
  - Audio: *ALSA*, *OSS, PulseAudio*
  - Video: *Framebuffer*, *OpenGL*, *SDL*, *VDPAU*, *X11*, *XVideo*

GeeXboX Enna: Embedded Media Center
libplayer Architecture



libvalhalla

Tiny Media Information Scanning Library

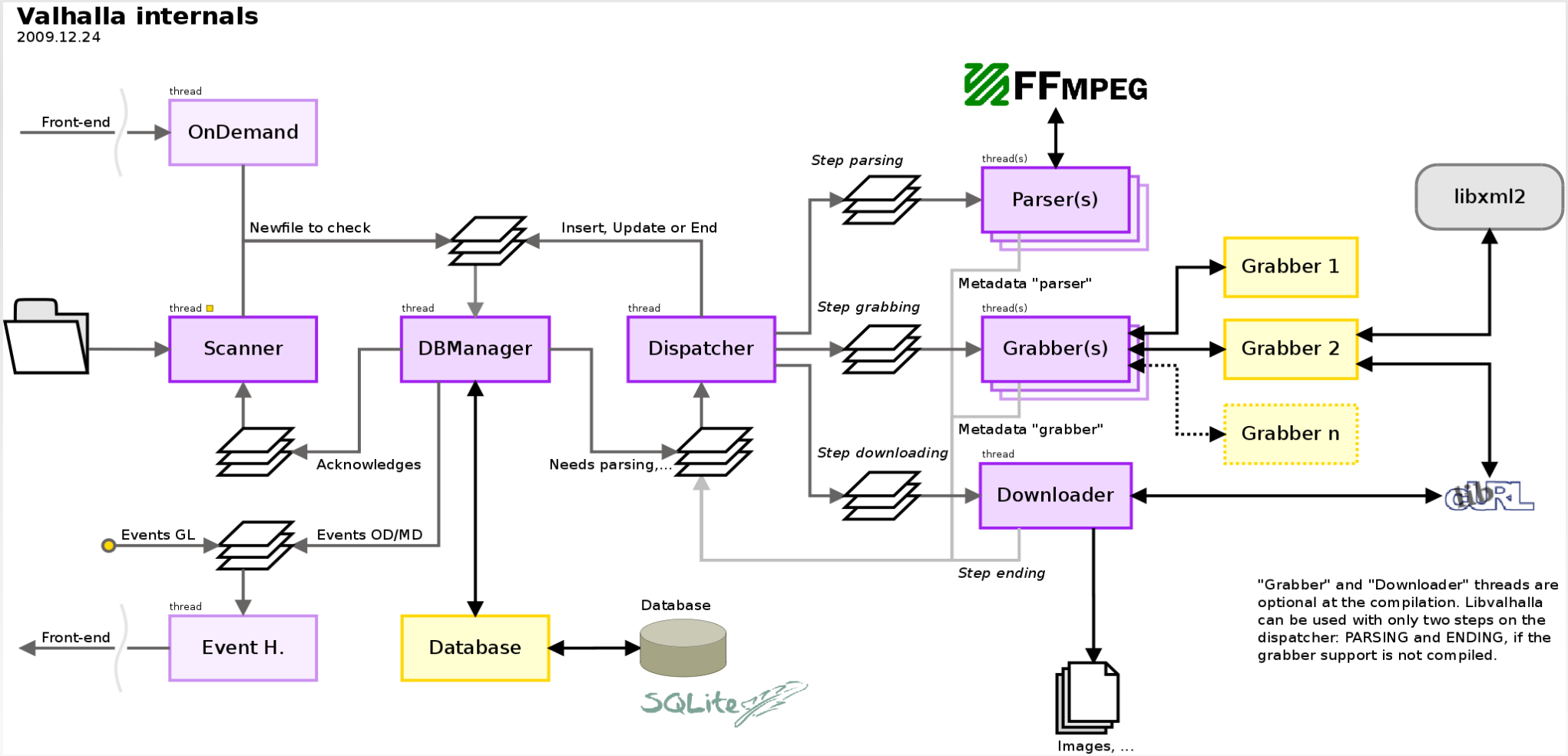
http://libvalhalla.geexbox.org/

GeeXboX Enna: Embedded Media Center
libvalhalla

- libvalhalla is a tiny media scanner library:
  - High-performances multi-threaded implementation.
  - Supports both background and on-demand operations.
  - Stores information in SQLite database.
  - Parses A/V stream properties through FFmpeg.
  - Features many on-line grabbers for automatic retrieval of covers, lyrics, synopsis, list of actors …

- Currently supported grabbers:
  - Offline: *EXIF, FFmpeg* and *NFO.*
  - Online : *Allocine, Amazon, ChartLyrics, ImDB, Last.fm, LyricWiki, TheMovieDB, TheTVDB and TVRage.*

GeeXboX Enna: Embedded Media Center
libvalhalla Architecture



Status & Roadmap

Pinky: "*Gee, Brain, what do you want to do tonight ?*"

The Brain: "*The same thing we do every night, Pinky—try to take over the world !*"

GeeXboX Enna: Embedded Media Center Status

- Enna first release (0.4.0) was made on 2nd January 2010.
  - First users feedback was quite impressive.
  - Mature code, part of most famous distros a few weeks later.
  - Will be key part of GeeXboX 2.0 release (alpha2 released in March).
- Still many competitors:
  - XBMC / Boxee, Moovida, Meedio, Win MCE …
  - But not targeting embedded device field
- Port to ARM-based devices in progress:
  Beagleboard, *Nokia N900* mobile phone, *TouchBook* …
- Next step/targets: ISP STB, connected TVs ...

GeeXboX Enna: Embedded Media Center
Expected features

- Seamless TV support through VDR skin.
- Additional online content connections:
  Picasa, Flickr, YouTube browsing ...
- Provide Video On Demand (VOD):
  Apple Trailers, Amazon.com, Netflix ...
- Instant Messaging (through *Telepathy* framework).
- VoIP Telephony, Video Conference and TelePresence.
- Get use of more and more hardware accelerators:
  - Additional ARM VFP and NEON optimizations.
  - OpenMAX DSP access for video playback
  - OpenGL|ES 3D GPU Acceleration
  - Flash 10 decoder

GeeXboX Enna: Embedded Media Center
That's all folks ...

Thanks

http://www.geexbox.org/